IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appelants:	Heiles et al.	**CERTIFICATE OF FACSIMILE TRANSMISSION** I hereby certify that this paper is being facsimile transmitted to the United States Patent and Trademark Office, Alexandria, Virginia on the date below.
Title:	PRINTHEAD ERROR COMPENSATION	*Todd A. Rathe* (Printed Name)
Appl. No.:	10/828,736	(Signature)
Filing Date:	April 21, 2004	
Examiner:	Lebron, Jannelle M.	(Date of Deposit)
Art Unit:	2861	

BRIEF ON APPEAL

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1.   Real Party in Interest

The real party in interest is Hewlett-Packard Development Company,
LP, a limited partnership established under the laws of the State of Texas and
having a principal place of business at 20555 S.H. 249, Houston, TX 77070,
U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a
wholly-owned affiliate of Hewlett-Packard Company, a Delaware corporation,
headquartered in Palo Alto, California. The general or managing partner of
HPDC is HPQ Holdings, LLC.

2.   **Related Appeals and Interferences**

There are no related appeals or interferences that will directly affect, be directly affected by, or have a bearing on the present appeal, that are known to Appellants or Appellants' patent representative.

3.   **Status of Claims**

Claims 1-43 were originally pending in the application. In an office action mail on December 8, 2006, claims 3, 5 and 37-39 were withdrawn from consideration. In response to the Office Action mailed on December 8, 2006, Appellants cancelled claims 29 and 37-39; amended claims 1, 32 and 40-43; and added claims 44-46. In response to an Office Action mailed on May 31, 2007, Appellants canceled claims 3-5; amended claims 1, 9, 10, 16, 17, 20, 23, 25 and 40-43; and added Claims 47-52. In response to an Office Action mailed on November 16, 2007, Appellants cancelled claims 2, 48 and 51; amended claims 1, 20, 32, 40-43 and 47; and added claim 53. In the final Office Action mailed on November 17, 2008, claims 6-8, 18-28, 30-36, 40-46, 49, 50, 52 and 53 were withdrawn from consideration, claim 20 was objected to and claims 1, 9-17 and 47 were rejected. This is an appeal from the Final Office Action mailed on November 17, 2008 finally rejecting claims 1, 9-17 and 47.

4.   **Status of Amendments**

The present appeal is directed to claims 1, 9-17 and 47, i.e., all of the presently pending claims that stand rejected in this application.

5.   **Summary of Claimed Subject Matter**

A.   Claim 1

Claim 1 recites a method for calibrating one or more printheads, the method comprising:

printing a first reference image (230, 232, 234, 236, 238) using a first portion (212) of image forming points (208) of a first printhead (62) (page 11, lines 4-29; Figure 7);

printing a first diagnostic image (250, 252, 254, 256, 258) using a second portion (214) of image forming points (208 of the first printhead (62), wherein the first reference image and the first diagnostic image at least partially overlap (page 11, line 30-page 12, line 26; Figure 8);

detecting a first optical density of the combined first reference image and the first diagnostic image (page 14, line 16- page 15, line 2); and

determining a compensation value based upon the first optical density (page 15, lines 3-25), wherein the first portion of image forming points comprises a first segment (212) of a column (202) of image forming points (208) and wherein the second portion (214) comprises a second segment (214) of the column (202) of image forming points (208) on the first printhead (62) (page 11, lines 4-29; Figure 7 and page 11, line 30-page 12, line 26; Figure 8).

B.   Claim 47

Claim 47 recites a method for calibrating one or more printheads, the method comprising:

printing a first reference image (230, 232, 234, 236, 238) using a first portion (212) of image forming points (208) of a first printhead (page 11, lines 4-29; Figure 7);

printing a first diagnostic image (250, 252, 254, 256, 258) using a second portion (214) of image forming points (208) of the first printhead (page 11, line 30-page 12, line 26; Figure 8), wherein the first portion of image forming points comprises a first segment (212) of a column (202) of image forming points and wherein the second portion comprises a second segment

(214) of the column (202) of image forming points (208) on the first printhead (62) and wherein the first reference image and the first diagnostic image at least partially overlap, wherein the first reference image is printed while the first printhead is at a first horizontal position and wherein the first diagnostic image is printed while the first printhead is at the first horizontal position (page 11, line 30-page 14, line 15; Figure 8);

detecting a first optical density of the combined first reference image and the first diagnostic image (page 14, line 16- page 15, line 2);

determining a compensation value based upon the first optical density (page 15, lines 3-25);

printing a second reference image with the first portion of the first printhead while the first printhead is at a second horizontal position (page 11, lines 4-29; Figure 7);

printing a second diagnostic image with the second portion while the first printhead is at a third horizontal position positively offset from the second horizontal position by a first offset distance (page 11, line 30-page 14, line 15; Figure 8);

detecting a second optical density of the combined second reference image and the second diagnostic image(page 14, line 16- page 15, line 2), wherein the compensation value is additionally based upon the second optical density (page 15, lines 3-25).

6.   **Concise Statement Listing Each Ground of Rejection for Review**

The issue on appeal is whether the Examiner erred in rejecting claims 1, 9-17 and 47 under 35 U.S.C. § 103(a) as being as being unpatentable over U.S. Patent No. 6,076,915 (Gast) in view of U.S. Patent No. 6,832,825 (Nishikori).

7. **Argument**

    I.   **Legal Standards**

Claims 1, 9-17 and 47 have been rejected under 35 U.S.C. § 103(a), which states:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The legal standards under 35 U.S.C. § 103(a) are well-settled. Obviousness under 35 U.S.C. § 103(a) involves four factual inquires: 1) the scope and content of the prior art; 2) the differences between the claims and the prior art; 3) the level of ordinary skill in the pertinent art; and 4) secondary considerations, if any, of nonobviousness. See KSR Intl v. Teleflex Inc., 550 US 398, (2007); Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966).

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. In re Piasecki, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-88 (Fed. Cir. 1984). "[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." In re Fritch, 972 F.2d 1260, 1265, 23 U.S.P.Q. 2d 1780, 1783 (Fed. Cir. 1992).

As noted by the Federal Circuit, the "factual inquiry whether to combine references must be thorough and searching." McGinley v. Franklin Sports,

Inc., 262 F.3d 1339, 60 U.S.P.Q. 2d 1001 (Fed. Cir. 2001). Further, it "must be based on objective evidence of record." In re Lee, 277 F.3d 1338, 61 U.S.P.Q. 2d 1430 (Fed. Cir. 2002). The teaching or suggestion to make the claimed combination must be found in the prior art, and not in the applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir. 1991). The test for determining the obviousness of combining known elements is not rigid, but depends on such factors as the interrelated teaching of multiple patents, the effects of demands known to the design community or present in the marketplace and the background knowledge possessed by a person of ordinary skill in the art. KSR Intl v. Teleflex Inc., 550 US 398, (2007). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 U.S.P.Q. 2d 1430 (Fed. Cir. 1990). "It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to '[use] that which the inventor taught against its teacher.'" Lee (citing W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983)). Teaching away from the claimed invention is a strong indication of non-obviousness and an improper combination of references. U.S. v. Adams, 383 U.S. 39 (1966).

II.   **The Examiner's Rejection of Claims 1, 9-17 and 47 under 35 U.S.C. § 103(a) as being as being unpatentable over U.S. Patent No. 6,076,915 (Gast) in view of U.S. Patent No. 6,832,825 (Nishikori) Should Be Reversed Because Neither Gast nor Nishikori, Alone or in Combination, Disclose Every Limitation of Each of the Claims.**

The claimed invention is not obvious under 35 U.S.C. § 103 unless the prior art reference or references teaches or suggests all of the claim limitations. In re Royka, 490 Fed. 2d 981 (CCPA 1994). Accordingly, the rejection of these claims under 35 U.S.C. § 103(a) is improper and should be reversed.

Claim 1 is directed to a method for calibrating one of more printheads, wherein the method includes printing reference images using a first segment of a column of image forming points of a print head and printing a diagnostic images using a second segment of the column of the image forming points of a print head, wherein the reference images and the diagnostic images at least partially overlap.

Claim 47 recites a method wherein multiple segments of a single column of image forming points on a printhead are calibrated with respect to one another.

As noted by Appellants in the specification, the method of claims 1 and 47enable adjustments to be made to correct for errors caused by irregular columns of nozzles. In particular, the method of claims 1 and 47 enable adjustments to be made to correct for columns of nozzles being curved such as shown in Figures 4 and 5 (known as scan axis directionality or SAD shape errors or for columns of nozzles being tilted such as shown in Figure 3 (known as THETA Z errors)). (See the present application, Paragraph [0053]).

Neither Gast nor Nishikori, alone or in combination, have anything to do with a method for calibrating printheads to correct for SAD or THETA Z nozzle column shape errors. Appellants recognize that claim 1 does not

specifically call out the errors that are addressed by the claimed calibration method. However, the claimed method still recites a unique combination of steps that allow these problems to be addressed.

The steps or methods disclosed by Gast simply do not and could not correct for SAD or THETA Z nozzle column shape errors. In contrast to claim 1 which requires that the reference image and the diagnostic image be printed using segments of a _single_ column of image forming points on a _single_ print head, Gast prints a reference image and a diagnostic image using DIFFERENT print heads. Clearly, if different print heads are use to print the reference image and the diagnostic image, the reference image and the diagnostic image cannot be printed using a single column from a single print head.

As with Gast, the steps or method disclosed by Nishikori simply does not and could not correct for SAD or THETA Z nozzle column shape errors. In fact, Nishikori does not even relate to any correction for any nozzle location error, let alone specifically correcting for novel shape errors. All that Nishikori does is correct for errors in the _amount_ of ink ejected by particular nozzles. The patches of Nishikori do not overlap. Moreover, although Nishikori may happen to print patches of ink from nozzles that happen to lie in the same column of nozzles, the fact that the nozzles lie in the same column has absolutely nothing to do with any adjustment for nozzle misalignment or location errors.

In rejecting claims 1 and 47, the Examiner clearly recognizes the above noted deficiencies of each of Gast and Nishikori. As a result, the Examiner attempts to pick and choose individual steps from each of these two completely unrelated references and to selectively combine such steps in a manner so as to satisfy each of the limitations of claims 1 and 47. However, this is merely a case of the Examiner improperly combining apples and oranges. This is merely a case of the Examiner improperly combining individual steps from Gast and Nishikori improperly using Appellants'

disclosure as a blueprint. Absent Appellants' disclosure, the Examiner cannot point to a single predictable different beneficial result that would be achieved ignoring the specific teachings of Gast by printing the overlapping test patterns of Gast using nozzles from the same column of nozzles on a single print head.

In rejecting the claims based upon Gast and Nishikori, the Examiner asserts:

> It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Gast et al. invention to include means for printing an image using a second portion of image forming points of a first print head, wherein the first portion of image forming points comprises a first segment of a column of image forming points and wherein the second portion comprises a second segment of the column of image forming points on the first print head as taught by Nishikori et al. for the purpose of determining optical densities for a plurality of locations of the print head and calibrating the print head to obtain better quality.

(Final Office Action dated November 17, 2008, page 10).

However, this alleged motivation is without merit because: (A) Gast and Nishikori are not from analogous fields of art; and (B) the alleged motivation for modifying Gast based upon Nishikori is untrue; such a modification would destroy the principle of operation and the functioning of Nishikori.

A. Gast and Nishikori are not from analogous fields of art.

Gast and Nishikori are not even remotely related to the same issues or the same problems. As noted above, Nishikori has nothing to do with compensating for nozzle positional misalignments of printheads. In contrast, Nishikori is solely related to adjusting the amount of fluid ink ejected from the nozzles of a print head. One of ordinary skill in the art looking to make

adjustments to correct for positional misalignments of inkjet printhead nozzles as in Gast would NOT look to Nishikori which addresses adjusting the amount of fluid ink ejected from nozzles. Thus, it would not be obvious to modify Gast based upon Nishikori.

B.   The alleged motivation for modifying Gast based upon Nishikori is untrue and such a modification would destroy the principle of operation and the functioning of Nishikori.

As noted above, the only basis that the Examiner alleges for hypothetically modifying Gast so as to print the overlapping test patterns of Gast using nozzles from the same column of nozzles on a single print head is that it would allegedly allow "determining optical densities for a plurality of locations of the printhead" (Final Office Action dated November 17, 2008, page 10).

However, this alleged motivation is untrue and such a modification would destroy the principle of operation and the functioning of Nishikori. It is well settled law that THE PROPOSED MODIFICATION CANNOT RENDER THE PRIOR ART UNSATISFACTORY FOR ITS INTENDED PURPOSE and THE PROPOSED MODIFICATION CANNOT CHANGE THE PRINCIPLE OF OPERATION OF A REFERENCE. (See MPEP 2143.01

Nishikori uses distinct nozzle blocks to print distinct patches that do <u>not overlap</u> **so that** the optical densities of the distinct patches may be compared and used to adjust the relative amounts of ink ejected by the nozzle blocks. To alternatively overlap the patches would seemingly prevent Nishikori from distinguishing between patches from different nozzle blocks and would thus prevent Nishikori from achieving its objective of adjusting the relative amount of ink ejected by the nozzle blocks. Such a modification would render Nishikori unsatisfactory for its intended purpose and would change the entire principle of operation of Nishikori. In contrast to the allegation made by the Examiner, such a modification would inhibit "determining optical densities for a plurality of locations of the print head."

In response to such points, the Examiner argues that "Nishikori is merely used to teach that printing an image using a second portion of image forming points is well known in the art." (Final Office Action dated November 17, 2008, page 11.

Yes, it was known to print patches using different image forming points of a single column of a single print head. However, it was <u>ONLY</u> known to do such for the purpose of determining how to adjust the AMOUNT of ink being ejected by individual nozzle (the disclosure of Nishikori). This required that the patches specifically NOT overlap. It was **not** known to print an <u>overlapping</u> reference image and diagnostic image using image forming points of a single column of a single print head. Accordingly, the rejection of claims 1 and 47 should be reversed. The rejection of claims 9-17 which depend from claims 1 should be reversed for at least the same reasons.

Conclusion

In view of the foregoing, the Appellant submits that claims 1, 9-17 and 47 are not properly rejected under 35 U.S.C. § 103(a) as being as being unpatentable over U.S. Patent No. 6,076,915 (Gast) in view of U.S. Patent No. 6,832,825 (Nishikori) and are therefore patentable. Accordingly, Appellants respectfully request that the Board reverse all claim rejections and indicate that a Notice of Allowance respecting all pending claims should be issued. Appellants further request reinstatement of withdrawn claims 6-8, 18-28, 30-31 and 44.

Summary

For the foregoing, it is submitted that the Examiner's rejections are erroneous, and reversal of the rejections is respectfully requested.

Dated this _30th_ day of _March_, 2009.

Respectfully submitted,

By _Todd A. Rathe_

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CLAIMS APPENDIX

1.   (Previously Presented) A method for calibrating one or more printheads, the method comprising:

printing a first reference image using a first portion of image forming points of a first printhead;

printing a first diagnostic image using a second portion of image forming points of the first printhead, wherein the first reference image and the first diagnostic image at least partially overlap;

detecting a first optical density of the combined first reference image and the first diagnostic image; and

determining a compensation value based upon the first optical density, wherein the first portion of image forming points comprises a first segment of a column of image forming points and wherein the second portion comprises a second segment of the column of image forming points on the first printhead.

9.   (Previously Presented) The method of Claim 1, wherein the first reference image is printed while the first printhead is at a first horizontal position and wherein the first diagnostic image is printed while the first printhead is at the first horizontal position.

10.   (Previously Presented) The method of Claim 9 including:

printing a second reference image with the first portion of the first printhead while the first printhead is at a second horizontal position;

printing a second diagnostic image with the second portion while the first printhead is at a third horizontal position positively offset from the second horizontal position by a first offset distance;

detecting a second optical density of the combined second reference image and the second diagnostic image, wherein the compensation value is additionally based upon the second optical density.

11.   (Original) The method of Claim 10, wherein the first reference image includes at least one mark having a width and wherein the first offset distance is no greater than the width.

12.   (Original) The method of Claim 10, wherein the first horizontal position and the second horizontal position have a common location.

13.   (Previously Presented) The method of Claim 10 including:

printing a third reference image with the first portion while the first printhead is at a fourth horizontal position;

printing a third diagnostic image with the second portion while the first printhead is at a fifth horizontal position positively offset from the fourth horizontal position by a second offset distance greater than the first offset distance; and

detecting a third optical density of a combination of the third reference image and the third diagnostic image, wherein the compensation value is determined based additionally upon the third optical density.

14.   (Original) The method of Claim 13, wherein the third reference image includes at least one mark, wherein each mark has a width and wherein the third offset distance is less than the width.

15.   (Original) The method of Claim 13, wherein the third horizontal position is offset from the second horizontal position in a first direction and wherein the fifth horizontal position is offset from the third horizontal position in the first direction.

16.   (Previously Presented) The method of Claim 15 including:

printing a fourth reference image with the first portion while the first printhead is at a sixth horizontal position;

printing a fourth diagnostic with the second portion while the first printhead is at a seventh horizontal position negatively offset from the sixth horizontal position by a third distance offset; and

detecting a fourth optical density of a combination of the fourth reference image and the fourth diagnostic image, wherein the compensation value is determined based additionally upon the fourth optical density.

17.   (Previously Presented) The method of Claim 16 including:

printing a fifth reference image using the first portion while the first printhead is at an eighth horizontal position;

printing a fifth diagnostic image using the second portion while the first printhead is at a ninth horizontal position negatively offset from the eighth horizontal position by a fourth distance greater than the third distance; and

detecting a fifth optical density of a combination of the fifth reference image and the fifth diagnostic image, wherein the compensation value is determined based additionally upon the fifth optical density.

47.   (Previously Presented) A method for calibrating one or more printheads, the method comprising:

printing a first reference image using a first portion of image forming points of a first printhead;

printing a first diagnostic image using a second portion of image forming points of F the first printhead, wherein the first portion of image forming points comprises a first segment of a column of image forming points and wherein the second portion comprises a second segment of the column of image forming points on the first printhead and wherein the first reference image and the first diagnostic image at least partially overlap, wherein the first reference image is printed while the first printhead is at a first horizontal position and wherein the first diagnostic image is printed while the first printhead is at the first horizontal position;

detecting a first optical density of the combined first reference image and the first diagnostic image;

determining a compensation value based upon the first optical density;

printing a second reference image with the first portion of the first printhead while the first printhead is at a second horizontal position;

printing a second diagnostic image with the second portion while the first printhead is at a third horizontal position positively offset from the second horizontal position by a first offset distance;

detecting a second optical density of the combined second reference image and the second diagnostic image, wherein the compensation value is additionally based upon the second optical density.

EVIDENCE APPENDIX

There is no evidence previously submitted under 37 C.F.R. §§ 1.130, 1.131 or 1.132 or other evidence entered by the Examiner and relied upon by Appellant in this appeal. Accordingly, the requirements of 37 C.F.R. §§ 41.37(c)(1)(ix) are satisfied.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a Court of the Board in a proceeding identified in the Related Appeals and Interferences section. Accordingly, the requirements of 37 C.F.R. §§ 41.37(c)(1)(x) are satisfied.